



# Mobile Devices Usage in Jordanian Banking Sector: Critical Success Factors Based On an improved Technology Acceptance Model (TAM)

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## Abstract

Despite the importance of mobile commerce; its adoption and level of use in Jordan is low if compared to other countries. This study aimed to understand and examines the critical success factors of mobile commerce that influence the adoption of M-commerce by banking customers in Jordan based on the technology acceptance model (TAM). This study also introduces a revised and extended mobile commerce technology adaption model for the banking sector in Jordan. We adopted a quantitative approach for this study and conducted a survey among Jordanian banks customers. 60 questioners were distributed amongst the Jordanian banks customers. This paper highlighted the critical success factors of mobile commerce that influence the adoption of M-commerce by banking customers in Jordan based on the technology acceptance model (TAM). As suggested by the result, an effective promotion among targeted users to use mobile commerce would create more impact on mobile commerce adoption.

## 1- Introduction

The term “electronic banking” was defined by [21] as the delivery of information and services by a bank to its customers using wired or wireless mediums. Banking industry is undergoing a radical transformation, each day we can notice new products, new players, and new channels [9]. The radical transformation for the banking industry can be related to the rapid evolves of Information Technology (IT), especially in electronic commerce (e-commerce).

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E-commerce has caused major changes in marketing, and increased the revenue for the companies. According to [3] the Mobile services around the world have generated more than \$1.3 trillion in 2011; the revenues are expected to reach \$1.8 trillion in 2016.

M-commerce can be defined as any transaction that is conducted using any mobile telecommunication network that allows for freedom of movement for the end user [5]. M-commerce has many attractive features, According to [1]; m-commerce can offer better ubiquity and accessibility to its users as compared to e-commerce. Customization [10] and Personalization [11] are another two useful benefits for the m-commerce users. In addition, mobile and wireless devices are allowing organizations to conduct business more effectively [8].

Mobile services usage and growth throughout the world is expanding [2]. The global mobile phone subscribers expected to be 8.5 billion in 2016 [3]. Revealed Statistics issued by the Telecommunications Regulatory Commission in Jordan [7]; said that the expected number of subscribers of cellular phone by the end of 2012 will be more than 8.5 million subscribers, compared with 7.48 million subscribers in 2011, and the base of Internet users in Jordan will reach about 4.0 million users at the end of 2012, compared to 3.137 million users in 2011.

Official figures revealed that Jordan imports of cellular devices approached the level of 158 million dinars in 2012. figures released by the Department of Statistics said the number of devices that have entered to the Jordanian market exceeded 2.7 million units since the beginning of the 2012 until the end of last December [1].

Jordanian individuals and organizations are late in the use of wireless technology [4], And also the M-commerce in Jordan is still at its early stage [4]. According to [6] the M-commerce in Jordan has not taken off; Amongst the reasons behind this as described by the Jordanian Ministry of Information and Communications Technology are: the lack of electronic payment system, the lack of legislation to support m-commerce, and the lack of awareness among consumers and business owners.

According to [22] mobile banking usage is increasing in many countries such as China, Brazil, Kenya, and USA. Table 1 shows the percentage.

**Table 1:** Percentage increase in mobile banking usage from 2010 to 2011

	Percentage of consumers using in		
	2010	2011	
China	10%	25%	150%
Brazil	10%	21%	110%
Kenya	6%	18%	200%
USA	11%	22%	100%

Source: [22]

In Jordan the first bank which called Ottoman Bank was established in 1925 followed by The Arab Bank in 1934. By 2008 the total number of banks in Jordan reached 23 banks.

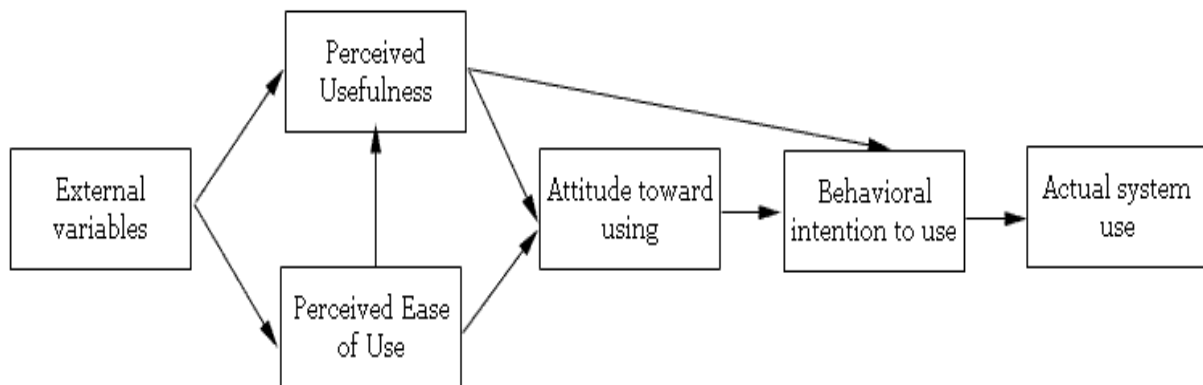
The authors in [9] studied mobile bank services adoption in Jordan based on Six factors: self-efficacy, trailability, compatibility, complexity, risk, and relative advantage. They found that all of those factors affect the mobile bank services adoption. In this study we will modify and use the well-known Technology Acceptance Model (TAM) to study the critical success factors of mobile commerce that influence the adoption of M-commerce by banking customers in Jordan.

According to [9] Mobile banking services are still in their early stages in Jordan and expected to witness tremendous increases as in many countries such as China, Brazil, Kenya, and USA. Therefore understanding the critical success factors of mobile commerce that influence the adoption of M-commerce by banking customers is important.

## 2. Technology Acceptance Model (TAM)

Based on the theory of reasoned Action, Davis [16] developed the Technology Acceptance Model, and since then; several models expanded the basic concept of user acceptance presented by the TAM model such as the theory of reasoned action (TRA), the motivational model (MM) and the unified theory of acceptance and use of technology (UTAUT).

TAM which presented in figure 1 can explain the user acceptance and usage behavior for the new technology. TAM suggests that perceived ease of use and perceived usefulness determine the user acceptance. The TAM model assumes that behavioral intention determines computer usage to use a system, where individual attitude toward using the system and perceptions of its usefulness determines the intention to use the system.



**Figure 1:** Technology Acceptance Model (TAM)

## 3. Research model and hypotheses

Yang in his paper [17] mentioned that researchers have extended TAM by the integration of external variables such as prior use and experience, privacy and security, cost ,and Internet connection quality. This study and

based on the available literature proposes its own model which extended from TAM model. The research model and hypotheses are shown in figure 2.

### ***3.1 Perceived usefulness***

TAM suggests that perceived usefulness is a major factor in the acceptance of an information system. Perceived usefulness is the degree to which a person believes that using a particular system would enhance his job performance. By applying this factor to the m-commerce context, the following hypothesis is proposed:

**H1:** Perceived usefulness has a significant influence on the Attitude toward use of M-commerce by bank customers in Jordan.

### ***3.2 Perceived ease of use***

PEOU is the degree to which a person believes that using a technology will be free from effort. By applying this factor to the m-commerce context, the following hypothesis is proposed:

**H2:** Perceived ease of use has a significant impact on the Attitude toward use of M-commerce by bank customers in Jordan.

### ***3.3 Attitude toward use***

Attitude toward use is an individual's positive or negative feelings about performing the target technology, it is a major factor determining whether an individual uses that system or not.

In this research, users perceived usefulness (PU) and perceived-ease-of-use (PEOU) and many other factors shown in figure 1 will determine the users attitude toward use. By applying this factor to the m-commerce context, the following hypothesis is proposed:

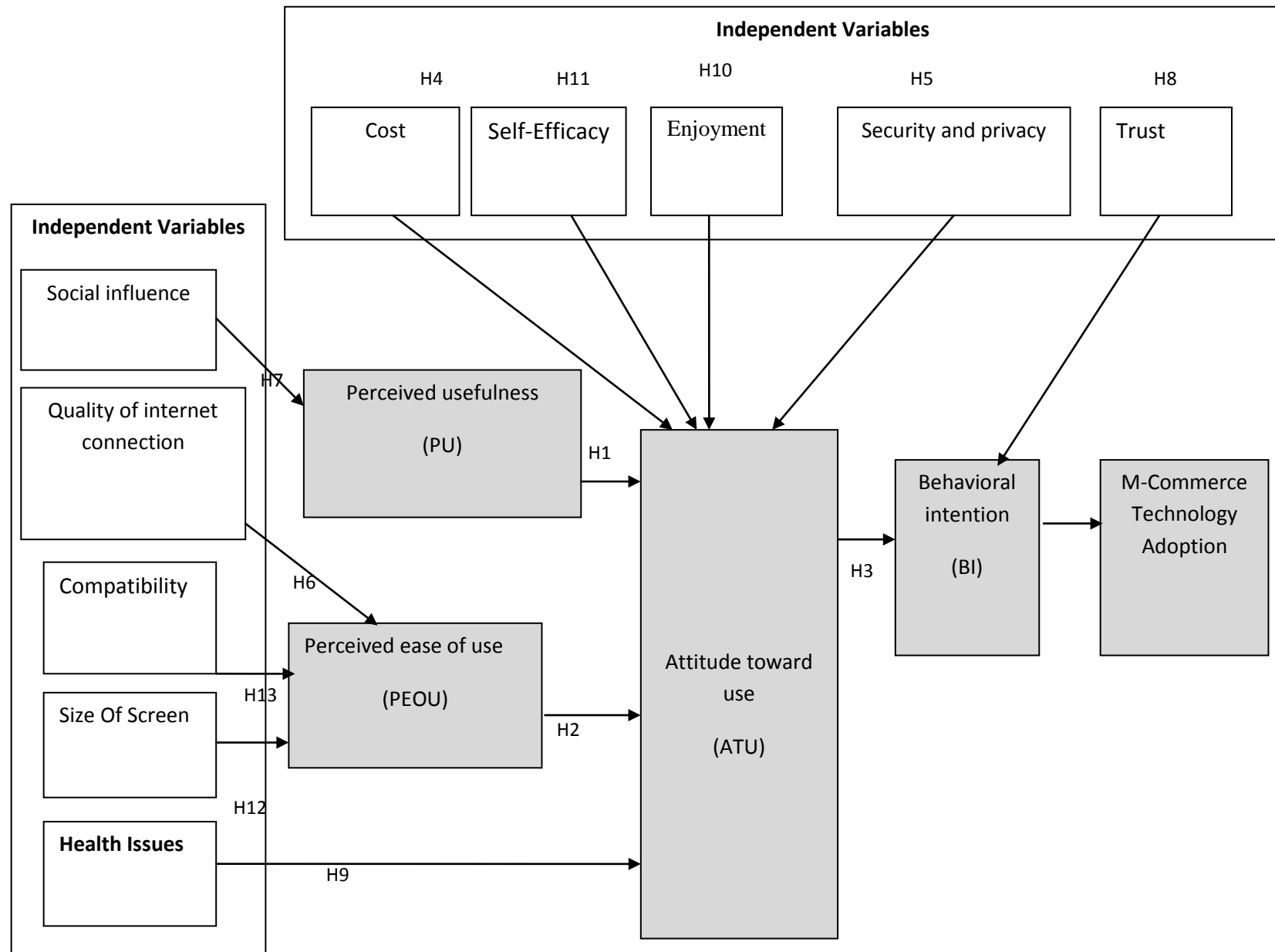
**H3:** The attitude toward using m-commerce has a positive impact on the behavioral intention to adopt M-commerce by bank customers in Jordan.

### ***3.4 Cost***

The price of mobile phone and the cost in accessing the Internet can affect the adaption of mobile bank services. According to [18] cost influences the perceived usefulness of m-commerce. The cost also founded to be as a major factor on the acceptance of mobile service [19]. Accessing the Internet through mobile wireless devices is still more costly than wired Internet access [15].

This study uses the cost as a factor that influences attitude toward use of m-commerce.

**Figure 3:** The research model for studying the adoption of m-commerce.



The following hypothesis is proposed:

**H4:** There is a significant relationship between cost and the attitude toward use of M-commerce by bank customers in Jordan.

### ***3.5 Privacy and security***

privacy and security are important for people in general and especially for the m-commerce users. as mentioned by [12] Privacy concerns has directly influenced mobile commerce users. Billions of mobile devices are accessing the Internet every day without any security mechanisms [14]. Also the wireless mobile technologies usually are more vulnerable to risks from hackers [13].

Islam and his colleagues [20] found that security influences consumer acceptance of a technology. The following hypothesis is proposed:

**H5:** There is a significant relationship between privacy and security and the attitude toward use of M-commerce by bank customers in Jordan.

### ***3.6 Quality of the Internet connection***

Internet connection quality is a vital component for any Internet-based application. The authors in [23] found that the Internet connection quality has a major impact on the adoption of online banking .

**H6:** There is a significant relationship between the quality of the Internet connection and

The Perceived ease of use by bank customers in Jordan.

### ***3.7 Social influence***

The author in [24] defined the social influence as “the degree to which an individual perceives that important others believe he or she should use the new system”.

Two researches [24,25] confirmed that social influence has an indirect impact on their intention to adopt m-commerce. The following hypothesis is proposed:

**H7:** Social influence has a positive influence on perceived usefulness for the bank customers in Jordan.

### ***3.8 Trust in mobile banking service providers***

According to [29] Customer trust in mobile banking is a critical factor for the success of mobile banking, and effect the initial trust in mobile banking user adoption.

**H8:** Customers' trust in mobile banking service providers has positive effect on the adoption of mobile banking.

### **3.9: Health Issues**

Both mobile users and businesses still have questions about using wireless technologies. The UK and Japan have done a lot of research on this issue. In 2006 Gould and his colleagues [13] found that most evidences confirms that mobile phone technology does not affect the health of the users. But many governments are asking the manufacturers of mobile phones to publish health proof [15].

**H9** : There is a significant relationship between the health **Issues** and the Attitude toward use by bank customers in Jordan.

### **3.10 Enjoyment**

We believe that Enjoyment is one of the important factors that affect significantly on attitude toward use of m-commerce ,Where it is believed that the use of wireless devices in the shopping and search for products online is an entertaining and enjoyable process, and in this study hypothesis was developed to study the effect of this factor. Following hypothesis is proposed:

H10: Enjoyment has a significant impact on the Attitude toward use by bank customers in Jordan.

### **3.11 Self-Efficacy**

We believe that the Self-Efficacy is important factors that affect significantly the perceived ease of use , Where it is believed that the use of wireless devices in the shopping online need knowledge, potentials, and capabilities from the client. The following hypothesis is proposed:

H11: Self-Efficacy has a positive impact on the Attitude toward use by bank customers in Jordan.

### **3.12: Size of Screen**

We believe that the Screen size affect the perceived ease of use where the greater the size of the screen, the more customer's ability to diagnose and examine the products offered in the e-commerce sites.

**H12**: There is a significant relationship between the size of mobile screen and

The Perceived ease of use for the bank customers in Jordan.

### **3.13: Compatibility**

Compatibility is the extent to which a new service is consistent with users' existing beliefs values, habits , and previous experiences [26]. Compatibility was integrated into the TAM model in the context of m-commerce by [27]. According to [28,27] compatibility will lead to higher perceived ease of use since less effort is required by the user.

**H13:** There is a significant relationship between the Compatibility and

The Perceived ease of use for the bank customers in Jordan.

**Table 2:** frequency table for the demographic factors

percentage	frequency	Category	Variable
60.0	36	male	Gender
40.0	24	female	
13.3	8	Un educate	education
26.7	16	Secondary	
40.0	24	Bachelor	
20.0	12	Graduate	
11.7	7	<18	Age
10.0	6	18-24	
18.3	11	25-31	
33.3	20	32-38	
26.7	16	>39	
13.3	8	Amman	Place
50.0	30	Zarqa	
1.7	1	Irbid	
35.0	18	other	
10.0	6	<299	Monthly income
30.0	18	300-500	
30.0	18	501-1000	
30.0	18	>1000	
100	60	Total	

#### 4. Research methodology

This research uses quantitative approach and conducted a survey among bank customers in Jordan to test research hypotheses and the proposed model.

A questionnaire was developed to call for responses from bank customers in Jordan about their perception of m-commerce technology. A five-point Likert scale was used for statements and ranged from 1 for strongly agree, to 5 for strongly disagree. The Validity of the questionnaire was confirmed by a pilot study to ensure that all the questionnaire statements were understandable. Cronbachs Alpha is used to measure the reliability of the questionnaire. After data analysis, all reliability measures were above the recommended level of 0.70, which



revealed that the reliability of factors was adequate for the internal consistency. using the SPSS 18 we extracted the Cronbachs Alpha coefficient and they were 0.918,0.905,0.896,0.845,0.972,0.869, 0.918, 0.938, 0.814, 0.908, 1.00 , 0.873 , 0.855, and 0.835 for perceived usefulness, perceived ease of use, attitude towards, behavioral intention, quality of Internet connection, security and privacy, cost , size of screen , enjoyment , self-efficacy , Trust ,health issues, Compatibility, and social influence respectively.

120 survey questionnaires were distributed to bank customers in Jordan using paper survey, we used random sampling method for this mission. Only 60 questionnaires were returned with response rate of 50%. The questionnaire contains two sections. The first section gathers demographic information such as age, gender, education level and occupational status. The second section asks about respondent attitudes regarding adoption and acceptance of m-commerce technology.

In this study, examining the results for the structural model and the hypothesis formed for each factor depends on testing the regressions path coefficients and the R-square values. the relationships between the independent and the dependent variables can be measured using the regressions path coefficients, while the R-square values show the amount of variance explained by the independent variables. Using both previous variables confirms how well the model is performing.

## 5. Demographics analysis

The survey results showed that the majority of respondents were male (36) which represents 60% and there were 24 women respondents, which represent 40% of the total participants.

Other demographic factors can be seen in tables 2.

The number of respondents who used e-commerce in Jordan was 75% of users.

**Table 3:** statistical analysis results

Variable	T-Calculated	P-value: Significance *	Degrees of freedom	R Square	$\beta$ coefficient positive \negative (+,-)	
PU	18.307	0.00	199	0.056	11.677	$Y=5.64+0.477X$
PEOU	21.698	0.00	199	0.164	38.912	$Y=1.721+0.637X$
IT Trust	16.712	0.00	199	0.489	189.542	$Y=1.603+0.633X$
E-Commerce adoption	18.324	0.00	199	0.367	114.656	$Y=1.729+0.6X$
Security	14.757	0.00	199	0.716	102.529	$Y=0.252+0.758X$
IT infrastructure	21.630	0.00	199	0.469	85.395	$Y=1.54+0.673X$

## 6. Conclusions

The objective of this study is to understand the factors affecting the adoption of mobile-commerce by bank customers in Jordan. Table 3 summarizes the results for those factors.

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